

What is claimed is:

1. A [magnetic] head suspension assembly [including] comprising:
an air bearing slider [and] having at least one transducer [disposed on said slider] mounted thereon for transducing data that is recorded and read out from a surface of a rotating magnetic [disk drive comprising:] disc;
a single integral planar piece [of a specified thickness] comprising[,]:
a load beam section formed with a narrowed end;
a flexure section having a shaped opening which defines [formed with] two [spaced narrow legs defining a cutout portion therebetween, said legs extending] flexure beams that extend in a longitudinal direction from said narrowed end of said load beam section, [and a lateral ear spaced] said flexure section further including a transverse section spaced in said longitudinal direction from said load beam section, said transverse section connecting said [legs] flexure beams;
a load point tongue extending from said narrowed end of said [narrowed] load beam section into said shaped opening, said load point tongue [being disposed between said legs of said flexure section, said tongue] having a free end within said [flexure section,] shaped opening and [said tongue] being formed with a load [dimple] supporting protrusion;
said air bearing slider being bonded to said [lateral ear] transverse section and in contact with said load [dimple; whereby] supporting protrusion [load transfer is effectively separated from the gimballing action of said slider so that the pitch and roll stiffness is effectively reduced].
2. An assembly as in claim 1, wherein said [head] air bearing slider has a top non-air bearing surface attached to said [flexure section] transverse section.
3. An assembly as in claim 2, further including means formed with said [lateral ear] transverse section for supporting said [attached head] air bearing slider.
4. An assembly as in claim 3, wherein said supporting means comprises outriggers or a split tongue.

5. An assembly as in claim 3, wherein said supporting means comprises said [lateral ear that connects said narrow legs] transverse section.

6. An assembly as in claim 2, wherein said air bearing slider is about 0.0110 inch high, 0.0400 inch long and 0.0200-0.0260 inch wide.

7. An assembly as in claim 2, wherein said top non-air bearing surface [of said slider] is formed with a platform and a step adjacent to said platform.

8. An assembly as in claim 7, wherein said platform [of said slider] is about 0.0336 inch long and said step is about 0.0015 inch high.

9. An assembly as in claim [2, including a load dimple formed in said tongue] 1, wherein said load beam section and said transverse section have a first thickness.

10. An assembly as in claim 9, wherein said load [dimple] supporting protrusion is hemispherical in shape [and faces down into contact with said top surface of said slider].

11. An assembly as in claim [1, wherein said single integral planar piece including said tongue is about 0.0012 to 0.0015 inch thick and said narrow legs are about 0.0010 inch thick] 9, wherein said flexure beams have a second thickness which is thinner than said first thickness.

12. An assembly as in claim 1, wherein said [load beam section is shaped as a truncated triangle] flexure beams are substantially parallel to said longitudinal direction so that said shaped opening is substantially U-shaped.

13. An assembly as in [claim 1,] claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12, wherein said load beam section has a rear end opposite said narrowed end, and further including:

a leaf spring section attached at a first end to said rear end of said load beam section, said leaf spring section providing a load force to said air bearing slider through said load supporting protrusion; and

[including] a mount section attached to a second end of said [at the rear end of said load beam] leaf spring section for [enabling mounting said suspension] attachment to an actuator arm]; and

a leaf spring section between said rear mount section and said load beam section for providing flexibility to said suspension].

14. An assembly as in claim 13, further including a swage plate joined to said mount section for [providing rigidity to said rear end of said suspension assembly] attachment to said actuator arm.

15. An assembly as in claim 13, including front flanges formed along the edges of said load beam section and rear flanges formed along the edges of said rear mount sections with a hiatus between said front and rear flanges] 1, wherein said load beam section has first and second sides, at least one of said sides having a flange integral therewith.

16. An assembly as in claim 15, wherein [said front flanges are formed with shallow U-shaped channels, and electrical wiring without tubing is positioned within said channels] said flange comprises a channel which accommodates an electrical wire.

17. An assembly as in claim 13, [including a cutout in] wherein said leaf spring section [for providing flexibility to said suspension] includes a trapezoidal-like opening.

18. An assembly as in claim 1, [further including an aperture extension formed at the rear end of said suspension assembly for enabling attachment to an actuator of a disk drive without a separate head arm to enable pivoting of said suspension assembly] wherein said load supporting protrusion is located along a centerline of said air bearing slider.

19. An assembly as in [claim 1] claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12, further including a damping [material on] element attached to said load beam section which reduces resonance.

20. An assembly as in claim [1] 15, further including at least one load/unload tab formed [at the sides of said] on at least one of said sides of said load beam section.

21. An assembly as in claim 2, wherein said top non-air bearing surface is substantially flat.

22. An assembly as in claim 21, wherein said [lateral ear] transverse section including bent sections for [contacting with said top surface of said slider] attachment to said air bearing slider.

23. An assembly as in claim 1 wherein said load point protrusion is offset a distance from a centerline of said air bearing slider.

24. An assembly as in claim 23 wherein said distance is between 0-0.006 inches.

25. An elongated disc drive magnetic head suspension formed from a single piece of planar material comprising:
a load beam;
a first member integral with said load beam having an integral protrusion facing in a direction normal to the plane of said single piece of planar material;
a second member also integral with said load beam spaced apart from said first member, said second member providing a head mounting surface in said direction; and
a pair of partially etched beams connecting said first and second members.

26. A head suspension as in claim 25 wherein said protrusion is disposed along a centerline extending between said pair of partially etched beams.

27. A head suspension as in claim 25 wherein said protrusion is offset a distance from a centerline extending between said pair of partially etched beams.

28. A head suspension as in claim 27 wherein said distance is between 0-0.006 inches.

29. A head suspension as in claims 25, 26, 27 or 28, wherein said load beam has first and second sides and includes an integral flange extending from at least one of said sides.

30. A head suspension as in claim 29 wherein said integral flange comprises a channel shaped to accommodate an electrical wire.

31. A method of making a disc drive mounting flexure from generally planar material having a first thickness, said method comprising the steps of:

(a) forming an opening having a shaped pattern at the end of a load beam to define a tongue part, a slider mounting part, and connecting flexure beams;

(b) forming a load point protrusion on a first material side of said tongue part which extends in a direction substantially normal to said first material side;

(c) etching said connecting flexure beams to a second thickness that is less than said first thickness.

32. A method as defined in claim 31 wherein said second thickness is about 0.0010 inches.

33. A method as defined in 31, further comprising the step of: forming a flange along at least one side of said load beam, said flange being integral with said load beam and having a channel shaped to accommodate an electrical wire.

34. A method as defined in claim 31, further comprising the step of: attaching a damping element on a surface of said load beam to reduce resonance.

35. A method as defined in claim 31, wherein step (b) further comprises the step of:

offsetting said load point protrusion a distance from a centerline extending between said flexure beams.